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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

GRAHAM, CHANTEL LORAN

ART UNIT

PAPER NUMBER

1797

MAIL DATE

DELIVERY MODE

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/718,559	Applicant(s) VELAPPAN ET AL.	
	Examiner CHANTEL GRAHAM	Art Unit 1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 July 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. The amendment filed 7/13/2009 has been entered and fully considered.
2. The 112 rejection is withdrawn in light of Applicant's amendments.
3. Claims 1 and 6 have been amended.
4. Claims 1-9 are pending and have been fully considered.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Billenstein (US 4,668,439) in view of Srivastava, Appal Energy and Anyang General.

In certain circumstances, references cited to show a universal fact need not be available as prior art before applicant's filing date. In re Wilson, 31 1 F.2d 266, 135 USPQ 442 (CCPA 1962). Such facts include the characteristics and properties of a material or a scientific truism. Some specific examples in which later publications showing factual evidence can be cited include situations where the facts shown in the reference are evidence or that characteristics of prior art products were known, In re Wilson, 31 1 F.2d 266, 135 USPQ 442 (CCPA 1962). References which do not qualify as prior art because they postdate the claimed invention may be relied upon to show the level of ordinary skill in the art at or

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around the time the invention was made. Ex parte Erlich, 22 USPQ 1463 (Bd. Pat. App. & Inter. 1992).

Billenstein teaches a method for preparing lower alkyl esters of soybean oil fatty acids and other oils by an alcoholysis reaction of the soybean fatty acid triglycerides with a lower alcohol (C1-C5) wherein the esters are useful as diesel fuel (see abstract; col. 1 lines 8-13). The oils include cottonseed, sunflower, castor and coconut (see col. 4, lines 2-11). In this process, a stream of gaseous alcohol (8-40 moles) is passed through the oil at temperatures of at least 210 degrees C and the product mixture of glycerol and fatty acid alkyl ester is discharged from the reaction zone with this stream and is then subjected to phase separation (see abstract; col. 4, lines 23-60). A catalyst such as sodium hydroxide may be used (see col. 5, lines 20-37). Phase separation takes place after all the condensates have been combined and may occur in settling vessels or in centrifuges (see col. 6, lines 13-25). Billenstein teaches the limitations of the claims other than the differences that are discussed below.

In the first aspect, Billenstein differs from the claims in that he does not teach the density and iodine value of the oil. However, Srivastava teaches the soybean oil has a density of 0.91 (Table 7) and an Iodine value of up to 2000 (see page 11, 6, first full paragraph).

In the second aspect, Billenstein differs from the claims in that he does not teach all of the process parameters with respect to time and the continuous turbulent conditions. However, differences in such parameters limits will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such parameters are critical.

In the third aspect, Billenstein differs from the claims in that he does not teach that the purification step involves bubble washing. However, it is a conventional method of purifying fatty acid esters and Anyang General teaches that bubble washing and the washing of Billenstein are art recognized equivalents.

It would have been obvious to one of ordinary skill in the art to select bubble washing as the method of purification because Appal teaches it is a conventional method of purification and Anyang teaches that it and washing are equivalent for the purpose of purifying esterified oil.

With respect to the size of the bubbles, it would have been obvious to one of ordinary skill in the art at the time the invention was made to optimize the size of the bubbles through routine experimentation for the best results. As to optimization of the results, a patent will not be granted based upon the optimization of result effective variables when the optimization is obtained through routine experimentation unless there is a showing of unexpected results which properly rebuts the prima facie case of obviousness. See *In re Boesch*, 617 F.2d 272,276,205 USPQ 215,219 (CCPA 1980). See also *In re Woodruff*, 91 9 F.2d 1575, 1578, 16 USPQ2d 1 934, 1 936-37 (Fed. Cir. 1990), and *In re Aller*, 220 F.2d 454,456, 105 USPQ 233, 235 (CCPA 1955).

With respect to the biodiesel being capable of exhibiting an NO_x emission reduction value in the range of 14-53%. Billenstein teaches a method similar to Applicant's method of preparing biodiesel (lower alkyl esters). Therefore, it would be reasonable to expect that the lower alkyl esters of Billenstein would reduce NO_x emissions within the claimed range, absent evidence to the contrary.

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7. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Billenstein in view of Klok (US 5,116,546).

Billenstein has been discussed above. Billenstein fails to teach purification by microfiltration. However, Klok teaches that the methyl ester of a transesterification process is filtered (see Examples 1 and 2). While Klok is silent with respect to microfiltration, the general teaching of filtration encompasses microfiltration and the skilled artisan recognizes the pore size of the filter that would be required to filter the methyl ester.

Response to Arguments

8. Applicant's arguments filed 7/13/2009 have been fully considered but they are not persuasive.

Applicant argues:

In the Office Action, the examiner admits that Billenstein does not teach the claimed process parameters with respect to time and continuous turbulent conditions. Nonetheless, the examiner asserts that the differences in the process parameters will not support patentability of the claimed subject matter. See Office Action, page 4, last paragraph. Applicants disagree with the examiner's assertion. In fact, the distinctions of the claimed process conditions over the prior art reference are one of the main factors that enable the claimed biodiesels to produce the reduced NO_x values.

Examiner respectfully disagrees and maintains the rejection of record:

Billenstein does teach that a process that can be carried out continuously; and the process is carried out with good thorough mixing from the bottom upwards in a bubble (col. 6 ln 34-59). Although Billenstein does not specifically teach “continuous turbulent conditions”, this reference does in fact teach a “process that can be carried out continuously; and the process is carried out with good thorough mixing from the bottom upwards” and it is the examiners position that the “a process that can be carried out continuously; and the

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process is carried out with good thorough mixing from the bottom upwards” is equivalent to “continuous turbulent conditions” and burden is upon applicants to show evidence otherwise.

Applicant argues:

Applicants' claimed process therefore produces an ecofriendly biodiesel product that is preferable from an environmental perspective. Such biodiesel product provides a diesel fuel substitute with many advantages. For example, the biodiesel can be used as pure biodiesel without blending of diesel and without any engine modification. The NOx emission reduction of biodiesel product from the claimed process was also confirmed in all the engine trials and on- road trials of the corporation buses.

Examiner respectfully disagrees:

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (see above arguments) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 11 81, 26 USPQ2d 1057 (Fed. Cir. 1993). The NOx emission reduction of biodiesel product has been given its broadest reasonable definition and has been interpreted to include the process that Billenstein, in view of Srivastava, Appal Energy and Anyang General, and further in view of Klok teaches.

Applicant argues:

Billestein, however, is completely silent relating to the fuel properties (such as NOx emission) of biodiesel. Moreover, Billestein does not teach or suggest the continuous turbulent conditions, which are one of the claimed process parameters to increase the conversion of the oil into ester and decrease the intermediates in the product. Rather, Billestein's process requires a rapid removal of the product mixture of glycerol and fatty acid alkyl ester from the reaction zone with the steam of alcohol. See Billestein, col. 2, lines 42-47 and col. 4, lines 23-28.

In addition to the continuous turbulent conditions, the reaction product of the claimed invention (liquid esters) is not removed from the reaction system as gas stream during the reaction and the reaction is run for a minimum reaction time

of "not less than 30 minutes." These claimed process conditions are both significant to increase the conversion and decrease the intermediates in the product, enabling the claimed biodiesels to exhibit reduced NO_x values. It is unclear how Billenstein's product, under such different reaction conditions, could reduce NO_x values in a range as Applicants claimed invention; and the examiner has not made a sufficient showing to suggest otherwise.

Examiner respectfully disagrees for at least the reason set forth above. Billenstein is relied on to teach a method for preparing lower alkyl esters of soybean oil fatty acids and other oils by an alcoholysis reaction of the soybean fatty acid triglycerides with a lower alcohol (C₁-C₅) wherein the esters are useful as diesel fuel. The oils include cottonseed, sunflower, castor and coconut. In this process, a stream of gaseous alcohol (8-40 moles) is passed through the oil at temperatures of at least 210 degrees C and the product mixture of glycerol and fatty acid alkyl ester is discharged from the reaction zone with this stream and is then subjected to phase separation. A catalyst such as sodium hydroxide may be used in the presence of not more than 0.55% w/w (col. 5 ln 45-50; 0.05 to 5% by weight). Phase separation takes place after all the condensates have been combined and may occur in settling vessels or in centrifuges. Srivastava is relied on to teach that soybean oil has a density of 0.91 and an Iodine value of up to 2000. Anyang General and Appal Energy are relied on to teach a conventional method of purifying fatty acid esters is by bubble washing. Klok teaches that the methyl ester of a transesterification process is filtered (microfiltration).

Applicant is reminded that a reference is good not only for what it teaches but also for what one of ordinary skill might reasonably infer from the teachings. *In re Opprecht* 12 USPQ 2d 1235, 1236 (CAFC 1989); *In re Bode* USPQ 12; *In re Lamberti* 192 USPQ 278; *In re Bozgek* 163 USPQ 545,549 (CCPA 1969); *In re Van Mater* 144 USPQ 421; *In re Jacoby* 135

USPQ 317; *In re LeGrice* 133 USPQ 365; *In re Preda* 159 USPQ 342 (CCPA 1968). In addition, "A reference can be used for all it's realistically teachings and is not limited to the disclosure in its preferred embodiments" See *In re Van Marter*, 144 USPQ 421.

In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

The Examiner is of the position that the claimed invention would have been obvious because all the claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination yielded nothing more than predictable results to one of ordinary skill in the art.

Applicant argues:

In addition, the claimed invention is a batch process, not a continuous counter-current process; and the claimed invention does not require the inert gas usage in the process. These conditions further distinguish Applicants' process over Billenstein's process.

Examiner respectfully disagrees:

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., batch process) is not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 11 81, 26 USPQ2d 1057 (Fed. Cir.1993). The process for the preparation of biodiesel has been given its broadest reasonable definition and has been

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interpreted to include the process that Billenstein, in view of Srivastava, Appal Energy and Anyang General, and further in view of Klok teaches.

Applicant argues:

Srivastava does not cure the deficiency of Billenstein. In particular, Srivastava relates to liquid-liquid phase reactions, whereby liquid oil and liquid alcohol-catalyst mixtures (below the boiling point of alcohol) are reacted under certain conditions to obtain esters (biodiesel) in liquid phase. Additionally, Srivastava teaches a temperature range that is different than that disclosed by both Applicants and Billenstein. See Srivastava, p. 126, item 6.4.1 ("The maximum yield of esters occurs at temperatures ranging from 60 to 80 °C at a molar ratio (alcohol to oil) of 6:1. Further increase in temperature is reported to have a negative effect on the conversion."). Based on these vastly different temperatures, one skilled in the art would not combine the teachings of Srivastava in the Billenstein process; hence Billenstein in view of Srivastava does not render Applicants' invention obvious.

Examiner respectfully disagrees for at least the reasons set forth above. Billenstein is relied on to teach that the temperature is 10-60 degrees above the boiling point of the alcohol (col. 6 ln 8-14); which are at temperatures of at least 210 degrees C (see Office action of record); however, as Applicant has disclosed that Srivastava does also teach temperatures which falls within the claimed range of "not exceeding 215 degree C".

In both cases, as discussed above, the ranges fall within or encompass the claimed ranges. "In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a prima facie case of obviousness exists. In re Wertheim, 541 F.2d 257, 191 USPQ 90 (CCPA 1976);" the invention as claimed, therefore rendered obvious by Billenstein in view of Srivastava.

Applicant argues:

Billenstein and Srivastava, alone or in combination, do not teach or suggest a method of using a liquid-gas phase transesterification reaction for a period of not less than 30 minutes under continuous turbulence conditions, to prepare biodiesel where the biodiesel is capable of reducing NOx emissions in the range of 14.4-15.3 %. Klok, which has been cited by the examiner only to show the

filtration techniques, fails to overcome the above-noted deficiencies of Billenstein and Srivastava. Accordingly, the claimed invention is patentable over Billenstein, Srivastava, Klok, or any combination of these references.

Examiner respectfully disagrees for the reasons set forth above.

Conclusion

9. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to CHANTEL GRAHAM whose telephone number is (571)270-5563. The examiner can normally be reached on M-Th 8:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Marcheschi can be reached on 571-272-1374. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system,

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/CHANTEL GRAHAM/
Examiner, Art Unit 1797

/Michael A Marcheschi/
Supervisory Patent Examiner, Art Unit 1797